Key to Icon

Web site.*

432.01 Introduction

This chapter includes information pertaining to WSDOT projects that impact floodplains. The chapter focuses mainly on road projects. If applicable, the policies, procedures, and permit requirements specific to ferries, airports, rail, and non-motorized transport are listed in **Section 432.07**.

(1) Summary of Requirements

The WSDOT Floodplain Discipline Report Checklist (**Exhibit 432-1**) provides the basis for identifying floodplain issues and sources of information. Other references, documents, MOUs, Interagency Agreements, and permits included in this chapter add relevant details.

The 1998 FHWA Environmental Flow Chart on Floodplains (**Exhibit 432-2**) gives a general overview of procedures required for floodplain analysis. The flow chart, which can be used to supplement the Floodplain Discipline Report, provides information and guidelines for discussing floodplain impacts with regulators.

Maintenance supervisors should be contacted during the project development phase to obtain input on existing flood hazards.

(2) Abbreviations and Acronyms

Abbreviations and acronyms used in this chapter are listed below. Others are found in the general list in **Appendix A**.

BFE	Base Flood Evaluation
CMZ	Channel Migration Zone
FAPG	Federal Aid Policy Guide
FCAAP	Flood Control Assistance Account Program
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
NFIP	National Flood Insurance Program

* Web sites and navigation referenced in this chapter are subject to change. For the most current links, please refer to the online version of the EPM, available through the EAO home page: http://www.wsdot.wa.gov/environment/

(3) Glossary

See **Appendix B** for a general glossary of terms used in the EPM.

Base Flood Elevation (BFE) – This refers to the calculated or estimated 100-year flood water surface elevation.

Flood – A general and temporary condition of partial or complete inundation of normally dry land areas from one of the following four sources:

- Overflow of inland or tidal waters.
- Unusual and rapid accumulation or runoff of surface waters from any source.
- Mudslides or mudflows that are like a river of liquid mud on the surface of normally dry land area, as when earth is carried by a current of water and deposited along the path of the current.
- Collapse or subsidence of land along the shore of a lake or other body of water as a result of erosion or undermining caused by waves or currents of water.

Floodplain – Any land area susceptible to being inundated by flood waters from any source; usually the flat or nearly flat land on the bottom of a stream valley or tidal area that is covered by water during floods.

Floodplain Boundaries – Lines on flood hazard maps that show the limits of the 100- and 500-year floodplains.

Floodway – The channel of a river or watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively raising the water surface elevation more that a designated height. Normally, the base flood is defined as the 1 percent chance flood and the designated height is 1 foot above the pre-floodway condition.

Special Flood Hazard Area – An area with a one percent chance of being flooded in any given year; hence the property is in the 100-year floodplain. The special flood hazard areas are further defined as numbered and un-numbered "A" zones which describe whether the determination is based on approximate or detailed flood studies, and whether formal BFEs have been established.

> ***Zone A*** indicates an un-numbered A zone without formal BFEs established. Zone is established through approximation.
>
> ***Zones AE and A1-A30*** indicate that the zone has established BFEs derived from a detailed hydraulic analysis.
>
> ***Zone AH*** usually corresponds to areas of ponding with relatively constant surface elevations. Average depths are between one and three feet.
>
> ***Zone AO*** corresponds to areas of shallow flooding (usually sheet flow on sloping terrain, where average depths are between one and three feet.
>
> ***Zone AR*** depicts areas in the floodplain that are protected by flood control structures such as levees that are being restored.
>
> ***Zone A99*** corresponds to areas that will be protected by a Federal flood protection structure or system where construction has reached statutory milestones. No BFEs are depicted in these zones.

Zone D indicates the possible but undetermined presence of flood hazards.

Zone V indicates additional coastal flooding hazards such as storm waves. Study is approximate and no BFEs are shown.

Zone VE indicates additional coastal flooding hazards such as storm waves. Study is detailed and BFEs are shown.

Zones B, C, and X correspond to areas outside of the 1 per cent recurrence floodplain with a one percent chance of shallow sheet flow or minor stream flooding with water depths of less that one foot. Studies are approximate and no BFEs are shown for these areas.

432.02 Applicable Statutes and Regulations

This section lists the primary statutes and regulations applicable to floodplain issues. See **Appendix D** for a list of statutes referenced in the EPM. Permits and approvals required pursuant to these statutes are listed in **Section 432.06**.

(1) National Environmental Policy Act/State Environmental Policy Act

The National Environmental Policy Act (NEPA), 42 USC Section 4321, requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations are given due weight in project decision-making. For work in floodplains that requires permit approval, environmental documentation must explain the impacts the project will have on these areas, and on the resources within those areas. The State Environmental Policy Act (SEPA), mandates a similar procedure for state and local actions. Federal implementing regulations are at 23 CFR 771 (FHWA) and 40 CFR 1500-1508 (CEQ). State implementing regulations are in WAC 197-11 and WAC 468-12 (WSDOT). For details see **Chapter 410** and **Chapter 411**.

(2) Floodplain Management

Floodplain Management, Presidential Executive Order 11988 (May 24, 1977) directs federal agencies to avoid to the extent possible adverse impacts associated with floodplains and to avoid direct or indirect support of floodplain development.

The Executive Order can be viewed at FHWA's web site:

http://www.fhwa.dot.gov/

Click on FHWA Programs, then Environment, then Environmental Guidebook, then Floodplains.

Or by direct link:

http://www.fhwa.dot.gov/environment/guidebook/chapters/v1ch6.htm

(3) Flood Control Management Act

The Flood Control Management Act of 1935, RCW 89, is the primary statutory authority regulating state flood control jurisdictions, which include flood control districts, counties, and zone districts. The act also regulates flood control management, flood control contributions, cooperation with federal agencies on flood control, and state participation in flood control maintenance. The 1937

RCW 86.09, Flood Control Districts, is the section of the act most relevant to WSDOT projects. For online reference, see:

http://slc.leg.wa.gov/

Click on RCW, then Title 86 – Flood Control, then Section 86.09, Flood Control Districts.

Or by direct link:

http://www.leg.wa.gov/RCW/index.cfm?fuseaction=chapterdigest&chapter=86.09

(4) Local Ordinances

Local ordinances may also regulate floodplain management. See **Section 550.03** for details on obtaining local approvals for work in floodplains.

432.03 Policy Guidance

None identified.

432.04 Interagency Agreements

(1) Memorandum of Agreement between WDFW and WSDOT - Construction of Projects in State Waters

This June 2002 MOA between WSDOT and WDFW, is designed to provide a mutual understanding between the agencies for application and acquisition of Hydraulic Project Approvals, and establishes procedures to comply with the Hydraulic Code Rules (WAC 220-110). The MOA promotes reduction of flood hazard, both by project design and by retrofitting undersized or below-standard stormwater conveyances. Revisions to this agreement are to be completed by December 2005. See **Section 436.04** for details.

(2) Other Agreements

For a complete index of interagency agreements referenced in the EPM, see **Appendix E**.

432.05 Technical Guidance

(1) WSDOT Discipline Report

A Floodplain Discipline Report is needed whenever a proposed project intersects or is located in a jurisdictional floodplain, particularly when the placement of new fill, structures, in-water structures (such as barbs or weirs), bridges, channel modifications, re-locations are involved. The rationale for determining that a full Discipline Report is not needed should be documented in a technical memo that is kept in the project file.

The Discipline Report Checklist (**Exhibit 432-1**) provides a basis for ensuring that floodplain issues are considered in projects. The information identified in the discipline report should provide the information required for floodplain permits and also for inclusion in EISs.

The checklist includes these sections: (1) introduction and preliminary drainage survey; (2) affected environment, shown mainly by mapping; (3) studies and coordination including flood history and identification of permits required; and (4) summary. The summary should include enough detail so it can be included in an EIS with only minor modification.

(2) FHWA Environmental Flow Chart

The 1998 FHWA Environmental Flow Chart on Floodplains (**Exhibit 432-2**) provides an overview of floodplain issues.

(3) FHWA Technical Advisory

FHWA Technical Advisory T 6640.8A (October 1987) gives guidelines for preparing environmental documents, including specifically the section on floodplains. For example, an EIS should identify whether proposed alternatives would encroach on 100-year floodplains, preferably demarcated by NFIP maps. Coordination with the Federal Emergency Management Agency (FEMA) and appropriate State and local government agencies should be undertaken for each floodway encroachment. If a floodway revision is necessary, an EIS should included evidence from FEMA and State or local agencies indicating that such revision would be acceptable.

The NFIP Flood Insurance Rate Maps (FIRMs) are designed for insurance purposes. As such, most are not accurate enough to rely upon for engineering design or land use decision-making. The NFIP maps tend to underestimate both the extent and depth of inundation, and this tendency should be taken into account. Some of the drawbacks of the FIRM maps are:

- Many do not have calculated Base Flood Elevations (BFEs) at all.
- Many are based on outdated hydrographic and channel cross-section data.
- Many are based on inadequate topographic data.
- The delineation of channel migration zones (CMZs) and the relationship between the CMZs and the 100 year floodplain are not well established on the FIRM maps, yet these are extremely important considerations with regard to planning transportation projects in the vicinity of floodplains, particularly those located near the larger, more dynamic rivers.

At a minimum, floodplain maps should contain topographic information accurate to two-foot contours or better.

Floodplains should be modeled using current and accurate hydrographic data using current cross-sectional data and properly calibrated modeling tools.

In addition to floodplain delineation and base flood elevation calculation, the CMZs should be mapped and overlaid in order to assess the possibility of channel migration or avulsion affecting project survivability.

The floodplain discipline report is structured to meet the requirements of the FHWA Technical Advisory. However, WSDOT should ensure that all requirements of the FHWA are met by carefully reading the Technical Advisory, which can be located under floodplain impacts on FHWA's web site:

http://www.fhwa.dot.gov/

Click on Legislation and Regulations, then FHWA Directives and Policy memorandums, then FHWA Technical Advisories. Check on Floodplain Impacts under T66400.8a.

Or by direct link:

http://www.fhwa.dot.gov/legsregs/directives/techadvs/t664008a.htm

(4) FHWA Environmental Guidebook

FHWA's online Environmental Guidebook contains several floodplain-related documents including guidance for the evaluation of encroachments on floodplains (February 22, 1982). Available via FHWA's web site:

http://www.fhwa.dot.gov/

Click on Programs, then Environment, then Environmental Guidebook, then Floodplains.

Or by direct link:

http://www.fhwa.dot.gov/environment/guidebook/chapters/v1ch6.htm

(5) FHWA Federal Aid Policy Guide on Floodplains

The Federal Aid Policy Guide (FAPG) of December 7, 1994, contains the FHWA's current policies, regulations, and non-regulatory procedural guidance information related to the federal aid highway program. (The FAPG replaced the *Federal Aid Highway Program Manual* on December 9, 1991.) Regulatory authority for this guidance is found in 23 CFR 650 Subpart A; 42U.S.C. 4001 *et seq*.; Public Law 92-234, 87 Stat. 975.

The FAPG includes policies and procedures for the location and hydraulic design of highway encroachments on floodplains. These policies and procedures can be viewed via the FHWA home page:

http://www.fhwa.dot.gov/

Click on Legislation and Regulations, then FHWA Directives and Policy Memorandums, then Federal-Aid Policy Guide, then Title 23, CFR (and Non-Regulatory Supplements) Table of Contents, then Subchapter G – Engineering and Traffic Operations, then Part 650 – Bridges, Structures, and Hydraulics, then Subpart A – Location and Hydraulic Design of Encroachments on Floodplains.

Or by direct link:

http://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0650a.htm

(6) Flood Emergency Procedures

ESO is coordinating with the WSDOT Maintenance Division to develop guidance for response to flooding and other emergencies. The definition of "emergency," and the appropriate expedited contracting and environmental procedures for responding to emergency are clarified in a memorandum from the Attorney General's office dated April 19, 2002. This memorandum is located on the ESO web site:

http://www.wsdot.wa.gov/environment/compliance/agreements.htm

See also the MOA on work in state waters, referenced in **Section 436.04**, and WSDOT's *Disaster Plan Manual* (M 54-11).

Further development of regional emergency project implementation guidance is needed, similar to the strategic plan for emergency flood repair on the Methow, Okanagon, Similkameen, Entiat, and Nooksack Rivers, prepared in May 1999 by Herrera and Associates, Inc. Reach Analyses prepared by WSDOT ESO for projects in problem areas along the Hoh, Nooksack, Naches, Sauk, Snohomish, Yakima, White and other rivers provide good templates for developing area-specific guidance.

Sites with repetitive damage histories (three events in 10 years) should be considered for nomination to the Chronic Environmental Deficiencies (CED) Program, which addresses repetitive damages sites associated with watercourses. Under the auspices of the CED program, ESO hydrologists and geomorphologists provide technical assistance to regions in preparing Reach Analyses to develop solutions to complex riverine problems. Information on the CED program can be found at:

http://www.wsdot.wa.gov/environment/fishpass/default.htm

(7) WSDOT GIS Workbench

Useful information may be obtained from the WSDOT GIS Workbench, a GIS interface for internal WSDOT users only. It has numerous layers of environmental and natural resource management data. WSDOT works with federal, state, and local agencies to maintain a collection of the best available data for statewide environmental analysis. Available data sets include FEMA data and other information necessary to write the floodplain reports. Local jurisdictions can be contacted to find out whether additional local floodplain mapping is available, on GIS or hard copy. WSDOT's GIS staff process requests for this information. For information on how to access the GIS Workbench, see:

http://www.wsdot.wa.gov/environment/envinfo/default.htm

For a list of current data sets, see WSDOT's web site:

http://www.wsdot.wa.gov/

Click on Maps & Data, then GIS Data Distribution Catalog.

Or by direct link:

http://www.wsdot.wa.gov/mapsdata/geodatacatalog/default.htm

(8) Flood Control Assistance Account Program (FCAAP)

The Flood Control Assistance Account Program (FCAAP) is a statewide financial assistance program, established by the legislature in 1984 to help local jurisdictions reduce flood hazards and flood damages (Chapter 86.26 RCW and Chapter 173-145 WAC). Matching grants are available to counties, cities, towns, special districts, and eligible tribes for comprehensive flood hazard management plans, specific projects or studies, and emergency flood-related activities. The program is administered by the Washington State Department of Ecology (Ecology). Applicants must participate in the National Flood Insurance Program

(NFIP). The Ecology web site below includes a general introduction to FCAAP grants, guidelines on how to apply for grants, an application form to download, sample grant agreements, invoice forms for grant recipients, progress report forms, and contacts at Ecology for more information and help in preparing or implementing grant agreements.

http://www.ecy.wa.gov/

Click on Programs, then Shorelands and Environmental Assistance, then Floodplain Management, Flood Control Assistance Account Program (FCAAP) grants.

Or by direct link:

http://www.ecy.wa.gov/programs/sea/grants/fcaap/intro.html

(9) Comprehensive Flood Hazard Management Plans

Comprehensive flood hazard management plans are described in Ecology's *Comprehensive Planning for Flood Hazard Management* (Ecology Publication #91-44). Approved plans must meet federal and state requirements for local hazard mitigation plans. Copies may be ordered online using information located on the Ecology web page:

http://www.ecy.wa.gov/

Click on Publications, then Order Publications.

Or by direct link at:

http://www.ecy.wa.gov/biblio/rporder.html

(10) Local Floodplain Management

Information on floodplain management with respect to local governments is online at:

http://www.mrsc.org/Subjects/PubSafe/emergency/ps-flood.aspx#Management

The web site includes links to floodplain ordinances for a number of Washington cities and counties.

432.06 Permits and Approvals

Projects in floodplains may be subject to one or more of the permits listed in **Section 431.06**, Water Quality. The only permit or approval relating specifically to floodplains are county or city floodplain development permits. For details, see **Section 550.03**.

432.07 Non-Road Project Requirements

Ferry, rail, aviation and non-motorized transport systems are subject to the same policies, procedures, or permits that apply to road systems for work in a floodplain.

432.08 Exhibits

Exhibit 432-1 – Floodplain Discipline Report Checklist.

Exhibit 432-2 – FHWA Environmental Flow Chart on Floodplains.

Washington State Department of Transportation

Discipline Report Checklist
Floodplain

Project Name: _____ Job Number: _____

Contact Name: _____

Date Received: _____ Date Reviewed: _____ Reviewer: _____

(SAT = Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)

Answers are required for questions which have no N/A box.

I. Introduction and Preliminary Drainage Survey

Studies shall contain:

- an analysis of design alternatives with consideration given to capital costs and risks; and
- the magnitude, approximate probability of exceedance and the water surface elevation associated with the overtopping flood.

Discipline reports need to include:

Investigation of potential problems, such as:

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Flood hazard.
☐	☐	☐		B.	Channel stability.
☐	☐	☐		C.	Effects on the environment - fish and wildlife, domestic water supplies, recreation.
☐	☐	☐		D.	Debris.
☐	☐	☐		E.	Skew of crossing.

II. Affected Environment

Site data:

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Vicinity map.
☐	☐	☐		B.	Site map showing location of proposed and existing encroachment/structures, cross-section of the stream, alignment of piers, skew of crossing.
☐	☐	☐		C.	Limits of 100-year floodplain.

III. Studies and Coordination

SAT	INC	MIS	N/A		
☐	☐	☐		A.	Is proposed action consistent with existing watershed and floodplain?
☐	☐	☐		B.	Permits required.
☐	☐	☐		C.	Current/proposed water resource projects.

Report must describe:

☐	☐	☐		D.	Flood history including:
☐	☐	☐			1. High water marks (with date and elevation).
☐	☐	☐			2. Nature of flooding.
☐	☐	☐	☐	E.	Existing structures including:
☐	☐	☐	☐		1. Type.
☐	☐	☐	☐	F.	Foundation type.
☐	☐	☐	☐	G.	Scour history.
☐	☐	☐	☐	H.	X-Section beneath structure.
☐	☐	☐		I.	Drainage area above encroachment.
☐	☐	☐		J.	Evaluation of potential for changes in watershed characteristics which may change magnitude of flood peaks.

Determination of flow patterns for the 100-year event in the natural channel for existing conditions.

IV. Summary

Summarize the analysis done and conclusions reached. The summary should include enough detail so that it can be included in the EIS with only minor modification.

The summary should include:

SAT	INC	MIS	N/A		
☐	☐	☐		A.	The objectives of the project.
☐	☐	☐		B.	Current floodplain use.
☐	☐	☐		C.	Impacts of all alternatives including the no-build alternative.
☐	☐	☐		D.	Recommended mitigation.
☐	☐	☐		E.	Comparison of alternatives based on impacts and cost effectiveness of mitigation.

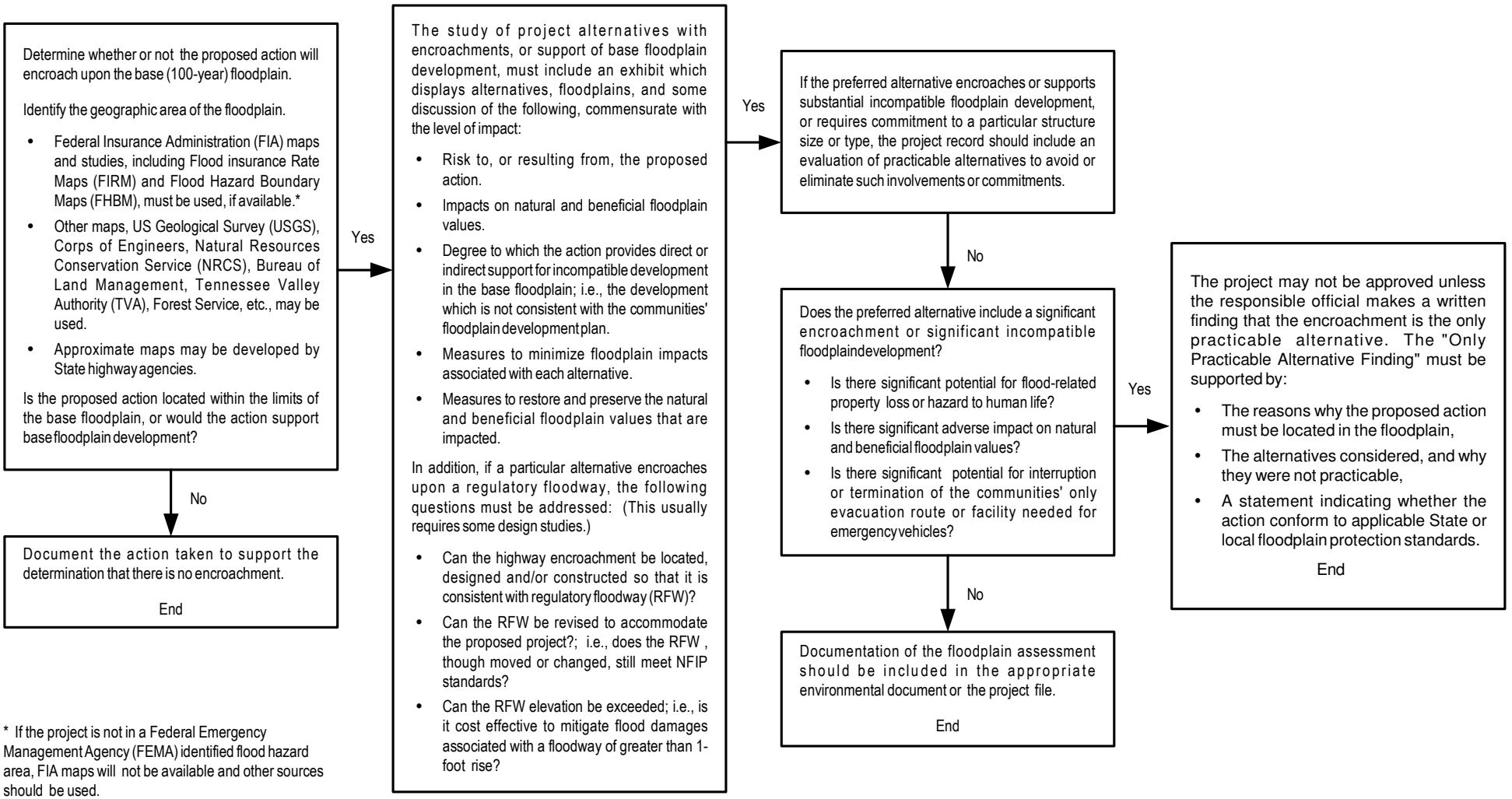
General Comments: _____

_____

_____

_____

FHWA Environmental Flowchart on Floodplains



* If the project is not in a Federal Emergency Management Agency (FEMA) identified flood hazard area, FIA maps will not be available and other sources should be used.

New Executive Order Draft Out Fall 1998